

ABSTRACT OF THE DISCLOSURE

Provided are a frequency synthesizer and a frequency synthesizing method. The frequency synthesizer includes a ring oscillator, duty buffers, half adders, and a switch. The ring oscillator receives a pair of input signals and generates a pair of oscillating signals. The duty buffers receive the pair of oscillating signals of the ring oscillator and generates output signals with predetermined duty cycles. The half adders receive output signals of the duty buffers and generate an output signal as a result of an Exclusive-OR operation on the output signals of the duty buffers and an output signal as a result of an AND operation on the output signals of the duty buffers. The switch selects one of the oscillating signals of the ring oscillator, the output signals as results of the Exclusive-OR operation, and the output signals as results of the AND operation. By using the frequency synthesizer, it is possible to select one of an oscillating-frequency output signal of a high-frequency ring oscillator, an output signal of a high-frequency that is two times higher than that of the oscillating frequency of the ring oscillator block, and an output signal of a frequency that is the same as that of an input signal.